

## **SECTION 02930**

### **VEGETATION**

#### **PART 1 GENERAL**

##### **1.01 SCOPE**

- A. This section includes seeding, mulching, fertilizing, liming, and maintaining vegetated areas until vegetation is established and accepted.

##### **1.02 RELATED SECTIONS AND PLANS**

- A. Section 02270 - Erosion and Sediment Control
- B. Section 02920 - Topsoil
- C. Surface-Water Management and Erosion Control (SWMEC) Plan, Revision 0, May 1997
- D. Part 8 - Environmental Health and Safety, and Training Requirements

##### **1.03 REFERENCES**

- A. Latest version of American Association of State Highway and Transportation Officials (AASHTO) standards:
  - 1. AASHTO M140. Standard Specification for Emulsified Asphalt.
  - 2. AASHTO M208. Standard Specification for Cationic Emulsified Asphalt.

##### **1.04 SUBMITTALS**

- A. Submit the following to the Construction Manager within 60 calendar days of Notice to Proceed for review:
  - 1. proposed seed mixes, mulch, asphalt emulsion tackifier, and fertilizers;
  - 2. Manufacturer's product data and recommended methods of application for seed, mulches, lime, asphalt emulsion tackifier, and fertilizer; and
  - 3. Material Safety Data Sheets (MSDS) for lime, fertilizer, and asphalt emulsion tackifier.
- B. Submit a Manufacturer's certificate of compliance for each seed mix. These certificates shall include the seed mixture, guaranteed percentages of purity, weed content,

germination of the seed, name of the seller, the test date for the seed, and the net weight and date of shipment. Do not sow seed until the Construction Manager has reviewed the certificates.

- C. After review of the product data for fertilizer, lime, and mulches by the Construction Manager, submit the following:
  - 1. a Manufacturer's certificate stating the available nutrients contained in the proposed fertilizer;
  - 2. a Manufacturer's certificate that the lime meets the requirements of this Section;
  - 3. a Manufacturer's certificate that the wood cellulose mulch meets the requirements of this Section; and
  - 4. a Manufacturer's certificate that the asphalt emulsion tackifier meets the requirements of this Section.

## **1.05 HEALTH AND SAFETY REQUIREMENTS**

- A. Environmental, health and safety, and other training requirements shall be as specified in Part 8 of the Contract Documents.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Furnish seed labeled in accordance with US Department of Agriculture (USDA) Rules and Regulations under the Federal Seed Act and applicable State seed laws. Furnish seed in sealed bags or containers bearing the date of expiration. Do not use seed after its date of expiration. Furnish seed from same or previous year's crop. Each variety of seed shall have a purity of not less than 90 percent, a percentage of germination not less than 80 percent, a weedseed content of not more than 0.75 percent, and contain no noxious weeds. The above percentages are by weight. Furnish seed mixtures having seed proportioned by weight in accordance with Tables 02930-1, 02930-2, and 02930-3.
- B. Furnish mulch meeting the requirements stated below.
  - 1. Furnish mulch consisting of straw or wood cellulose fiber unless otherwise directed by the Construction Manager. Furnish mulch that is free of clay, stones, foreign substances, and reasonably free of other weed seeds.
  - 2. Furnish straw that does not contain sticks larger than 1/4-inch diameter or other materials that may prevent matting down during application. No straw shall be used within 48 hours after cutting. Use straw that is free from mold and other

objectionable material and in an air-dry condition suitable for placing with mulch blower equipment. Straw shall be 6 inches or more in length.

3. Mulch applied by spraying shall be a wood cellulose processed into a uniform fibrous physical state. Use wood cellulose fiber containing a green dye that will provide easy visual inspection for uniformity of the slurry spread. The wood cellulose fiber, including dye, shall contain no growth or germination-inhibiting properties. The wood cellulose fiber shall be manufactured in such a manner that, after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogeneous material. When sprayed on the ground, the material shall allow absorption and percolation of moisture. The wood cellulose fiber shall meet the following requirements:

<u>Quantity</u>	<u>Specification Limit</u>
Particle Length	0.775 inch (maximum)
Particle Thickness	0.047 inch (maximum)
pH	4.0 to 8.5
Ash Content	1.6 percent (maximum)
Water Holding Capacity	90 percent (minimum)

Deliver the material in uniform packages bearing the name of the manufacturer, the net weight, and a statement of content.

- C. Use asphalt emulsion tackifier for mulch conforming to AASHTO M140 or AASHTO M208. Asphalt emulsion tackifier shall be nontoxic to plants and shall be prepared so that it will not change in transportation or storage.
- D. Use fertilizer that is dry or liquid commercial grade fertilizer uniform in composition that meets the requirements of all State and Federal regulations and standards of the Association of Agricultural Chemists. Deliver fertilizer to the site in original, properly labeled, unopened, clean, containers each showing the manufacturer's guaranteed analysis conforming to applicable fertilizer regulations and standards. Use fertilizer that is 10-10-10, 12-12-12, or as modified by the Construction Manager based on testing of the topsoil by the CQC Consultant. Apply fertilizer to all areas receiving seed.
- E. Use lime that is agricultural ground limestone with a minimum total neutralizing power of 90 percent. The lime shall have a material gradation of at least 40 percent passing the U.S. Standard Number 100 sieve, and at least 95 percent passing the U.S. Standard Number 8 sieve.

## **PART 3 EXECUTION**

### **3.01 APPLICATION**

- A. Apply fertilizer, lime, seed, mulch, and asphalt emulsion tackifier to disturbed areas and areas graded under this Contract at and adjacent to the OSDF requiring vegetative cover unless otherwise indicated.
- B. Application rates:
  - 1. Application rates for fertilizer, lime and seed as specified in this Section may be adjusted after the results of the site soil test results have been evaluated by the Construction Manager.
  - 2. Base contract price on application rates for fertilizer, lime, seed, mulch, and asphalt emulsion tackifier specified in this Section. Contract price will be adjusted for any variations either decreasing or increasing the application rates for fertilizer or lime specified in this Section.
- C. For areas to be seeded:
  - 1. Apply fertilizer at a uniform rate of 12 pounds per 1000 square feet or as otherwise directed by the Construction Manager.
  - 2. Apply the specified seed mix at the rates indicated on Tables 2930-01, 2930-02, and 02930-03.
  - 3. Spread straw mulch either by hand or by the blowing method at the rate of 2 air-dried tons per acre within 24 hours of seeding.
  - 4. Apply sprayed wood cellulose fiber, at a net dry weight of 750 pounds per acre. Mix the wood cellulose fiber with water at a ratio of 50 pounds of wood cellulose fiber per 100 gallons of water.
  - 5. Apply agricultural lime at a rate of two tons per acre or as otherwise directed by the Construction Manager.
  - 6. Apply asphalt emulsion tackifier at a rate of 120 gallons per acre.
- D. The application of fertilizer and lime may be concurrently performed hydraulically with pasture species or temporary vegetation in one operation by hydro-seeding. All structures and paved areas shall be cleared of deposits of the hydroseed mixture.

### **3.02 PLACEMENT**

- A. Perform temporary vegetation as required by Section 02270 or the SWMEC Plan.

- B. Do not commence permanent vegetation until the results of soil analyses are available without approval from the Construction Manager.
- C. Vegetation of the OSDF final cover shall commence upon completion of the topsoil placement as specified in 02920. Vegetation of other areas shall commence when the areas have been brought to final grade.
- D. Perform permanent seeding, fertilizing, liming, and mulching (if applicable) only during those periods indicated in Table 02930-1. Hydroseed only on a calm day with winds below twenty miles per hour. Do not seed on frozen ground or when the temperature is 32 F or lower with the exception of Switchgrass.
- E. Notify the Construction Manager 24 hours prior to seeding or fertilizing.
- F. In cut areas to be vegetated, loosen the finished subgrade to a depth of 4 to 6 inches by discing or harrowing immediately prior to application of lime, fertilizer and seed.
- G. In compacted fill areas to be vegetated, scarify areas to be hydro-seeded and disc or harrow all other areas to a depth of 4 to 6 inches immediately prior to application of lime, fertilizer and seed.
- H. Apply fertilizer and lime at the specified rate or hydraulically with seed. If not applied hydraulically, thoroughly harrow, disc, or rake the fertilizer and lime into the prepared surface to a minimum depth of 2 inches.
- I. Prior to seeding, track the prepared surface with a bulldozer up and down the slope, and repair all gullies, washes, or disturbed areas that develop.
- J. Apply seed at the rates indicated in Tables 02930-01, 02930-02, and 02930-03. Apply seed by drilling, broadcasting, or hydro-seeding as described below.
  - 1. Seeding by drilling shall be done to a depth of 0.25 inches followed by cultipacking.
  - 2. For hydro-seeding:
    - a. The spraying equipment and mixture shall be designed such that when the mixture is sprayed over an area, the fertilizer, seed, and mulch shall be equal in quantity to the specified rates.
    - b. Prior to the start of work, furnish the Construction Manager with a certified statement as to the number of pounds of materials to be used per 100 gallons of water. The certified statement shall also specify the number of square feet of seeding that can be covered with the quantity of solution in the hydroseeder.

- c. Seed and/or fertilizer and lime shall be mixed together with water in the relative proportions specified so that these combined solids do not exceed 300 pounds per 100 gallons. Mixing shall be done within one hour of application.
  - d. The water-seed-fertilizer-lime mixture shall be applied at a minimum rate of 1,000 gallons/acre.
  - e. After hydro-seeding on flat areas, the seedbed shall be immediately rolled with a roller weighing 40 to 65 pounds per foot of width unless an intervening precipitation causes such rolling to be detrimental to the seeded area.
  - f. Upon completion of seeding operations, furnish the Construction Manager with a certified statement on the actual quantity of solution applied.
- K. Repair all gullies, washes, or disturbed areas that develop subsequent to final dressing of the prepared surface.
- L. At areas not receiving erosion mat, apply mulch materials on seeded areas within 24 hours after seeding. Mulch shall achieve a uniform distribution and depth so that no more than 10 percent of the soil surface is exposed. Maintain straw mulching materials in place with an asphalt emulsion tackifier.

### **3.03 MAINTENANCE**

- A. Maintain the vegetated areas in satisfactory condition until acceptance of the vegetation by the Construction Manager. Maintenance of the vegetated areas includes repairing eroded areas, revegetating, watering, and mowing (if applicable). A satisfactory condition of vegetated area is defined as follows:
- 1. an area shall have a good, clean stand of perennial grass;
  - 2. within 3 weeks, germination must occur over 95 percent of the area with no single bare area greater than 3 square feet; and
  - 3. within 3 months, 95 percent of the area must be covered with mature perennial grass.
- B. Areas that fail to meet these requirements shall be repaired or reseeded as necessary to produce an acceptable stand of grass, as specified in this Section.
- C. The acceptance inspection will be performed by the Construction Manager who will determine whether repair of vegetated areas or revegetation is required.

### **3.04 ACCEPTANCE**

- A. The vegetated areas shall be accepted at the end of the warranty period if a satisfactory condition exists as defined in this Section .

### **3.05 WARRANTY PERIOD**

- A. Vegetated areas shall be subject to a guarantee period of not less than 2 full growing seasons from initial establishment of permanent vegetation over 100 percent of the areas seeded.
- B. At the end of the warranty period, the Construction Manager will perform an inspection upon written request by the Contractor. As part of the inspection, the Construction Manager may collect soil samples from areas not demonstrating satisfactory vegetation conditions and forward them to the local Natural Resources Conservation Service (NRCS) for recommendations. Vegetated areas not demonstrating satisfactory condition of vegetation as outlined above, shall be repaired, reseeded, and maintained to meet all requirements as specified herein at the Contractor's expense.
- C. After all necessary corrective work has been completed, the Construction Manager will certify in writing the final acceptance of the vegetated areas.

**TABLE 02930-01**  
**SEED MIXES FOR PERMANENT VEGETATION**  
**NATIVE SPECIES**  
**(OSDF FINAL COVER SYSTEM ONLY)**

Application	Planting Period	
	Apr - May <sup>1</sup>	
	Species <sup>2</sup>	lb/ac
Drainage Channels	Big Bluestem	10
	Switchgrass	5
All Other Areas	Big Bluestem	5
	Indiangrass	5
	Canada Wildrye	3
	Switchgrass	5

- Notes:
1. Switchgrass should be frost seeded (Jan - Feb) by broadcasting into winter cover.
  2. "Cave-in-rock" switchgrass variety recommended. Species other than switchgrass should be planted by drilling during April - May.

**TABLE 02930-02**  
**SEED MIXES FOR PERMANENT VEGETATION**  
**PASTURE SPECIES**

Application	Planting Period	
	15 Mar - 31 May or 1 Aug - 30 Sep	
	Species	lb/ac
Drainage Channels	Reed Canarygrass	8
	Kentucky Bluegrass	10
	Alsike Clover	5
All Other Areas	Creeping Red Fescue	20
	Annual Ryegrass	10
	Kentucky Bluegrass	15
	Alsike Clover	5
	Flatpea	5

**TABLE 02930-03**  
**SEED MIXES FOR TEMPORARY VEGETATION**

Planting Period			
Warm Season (Jun - Aug)		Cool Season (Aug - Nov)	
Species	lb/ac	Species	lb/ac
Annual Ryegrass	40	Annual Ryegrass	40
Oats	64	Rye	80
Sudangrass	80	Perennial Ryegrass	20

[END OF SECTION]